CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as First Class Mail in an envelope addressed to Mail Stop: Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: March 5, 2007 | **Name: Nancy Doble** | **Signature:** Nancy Doble

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of John W. Evans, et al.	)	Examiner:	N. Ogden
Serial No.: 10/629,642	)	Confirmation No.:	6851
Filing Date: July 29, 2003	)	Group Art Unit:	1751
For: NON-AQUEOUS HEAT TRANSFER FLUID AND USE THEREOF	)	Docket No.:	97541.00022

Dated at Hartford, Connecticut this 5th day of March, 2007

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF JOHN EVANS

I, John Evans, do hereby declare and say as follows:

1. I am an inventor of the above-referenced patent application regarding methods for cooling internal combustion engines or other heat generating devices using an ethylene glycol based aqueous heat transfer fluid. I am also the Chairman of the assignee of the patent application, Evans Cooling Systems, Inc.

2. The non-aqueous heat transfer fluids recited in the claims of the above-referenced patent application are fundamentally different from prior art aqueous heat transfer fluids. The primary heat transfer medium of an aqueous heat transfer fluid is water. The freezing point depressant for a glycol-based aqueous heat transfer fluid is a glycol, typically ethylene glycol. The glycol and water combination also has a boiling point that is slightly higher than water

alone. Water is corrosive toward many cooling system metals and corrosion inhibitors that can dissolve in water are required in order to protect against corrosion.

3. Essential inhibitors for protection against corrosion by an aqueous glycol-based heat transfer fluid require that water be present in order to keep the inhibitors in solution. The literature is replete with warnings against using heat transfer fluid that are too concentrated (i.e., with insufficient water) because of the problem of additive drop-out, such as the drop-out of silicates or phosphates.

4. Water is also required in *concentrates* for making aqueous heat transfer fluids. The concentrate must contain enough water to keep its additives dissolved during storage prior to the adding of water to make the actual heat transfer fluid.

5. Use of an antifreeze concentrate that is intended for making an aqueous glycol-based heat transfer fluid as a heat transfer fluid itself (without the additional water) will not work because the inhibitors that require water for solubility will not remain in solution. In an automobile cooling system, for example, the products of additive drop-out are in the form of a gel that will plug heat exchanger passageways and cause the cooling system to malfunction.

6. The non-aqueous heat transfer fluid of the present invention operates in a fundamentally different way than prior art aqueous heat transfer fluids. The heat transfer medium of the propylene glycol based non-aqueous heat transfer fluid of the present invention is propylene glycol. The parameters regarding the heat transfer depend upon the characteristics of the propylene glycol (or the mixture of glycols if there is more than one). The freezing point of the non-aqueous heat transfer fluid is determined by the freezing point of propylene glycol (or by the freezing point of the mixture of glycols if there is more than one). The boiling point of the

propylene glycol-based non-aqueous heat transfer fluid is determined by the boiling point of propylene glycol (or by the boiling point of the mixture of glycols if there is more than one).

7. Water is not added to the non-aqueous heat transfer fluid . If water is present, it is in small amounts as an impurity. The best performance is achieved when the water content is zero. If there is localized boiling of a non-aqueous glycol-based heat transfer fluid that contains some water present as an impurity, the resulting vapor would be almost entirely water vapor. The water vapor would not condense in the surrounding fluid and would become vented from the system.

8. Prior to the present invention, the most common heat transfer fluids were water-based and the prior art was primarily directed toward water-based heat transfer fluids. In the limited descriptions of glycol-based, non-aqueous heat transfer fluids, the views regarding additives were: (1) no recognition or discussion of using additives; (2) at least pH control additives were required, or (3) use of additives, including pH control additives, to address the concern of water entering the heat transfer fluid and causing corrosion.

9. These views resulted in various approaches to the use of glycol-based, non-aqueous heat transfer fluids prior to the disclosure of the present invention that resulted in either omission of important additive ingredients or including inappropriate additive ingredients that require water to be present in the heat transfer fluids.

10. For example, some tests of propylene glycol based heat transfer fluids were performed without any corrosion additives present in the fluid, such as those described in Coughenour and Dingley.

11. In other cases, as described for example in Reny, concern about pH caused the inclusion of pH control additives, such as phosphoric acid buffers. For phosphoric acid to

function in a manner as to affect pH, water must be included in order for the phosphoric acid to ionize. The action of the phosphoric acid creates phosphates that further require water for the phosphates to be in solution. Below a minimum amount of water, the phosphates will not remain in solution and will drop out as solids that can plug heat exchanger passages.

12. In still other cases, as described for example in Mascioli, Greaney and Wood (in antifreeze concentrates that have been incorrectly treated by the Examiner as non-aqueous heat transfer fluids), the heat transfer fluids include water soluble (but non-glycol-soluble) additives, such as sodium metasilicates, that require the presence of added water to dissolve the additives so as to enable them to perform their function.

13. Contrary to the descriptions in these and other references, I recognized that when the water content is very low, the pH of the fluid is immaterial, and that the heat transfer fluid must avoid all additives that cannot function without water.

14. The heat transfer fluids claimed in the present application do not include any additives that require water in the heat transfer fluid to dissolve or to perform their function.

I, the undersigned, declare further that all statements made herein are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: March 5, 2007

John W. Evans

John Evans